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Francis A Cooch
Deputy General Counsel
The Johns Hopkins University Applied Physics Lab
11100 Johns Hopkins
Laurel, MD 20723-6099

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JOYNER, KEVIN	

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/541,112
Filing Date: June 30, 2005
Appellant(s): POTEMBER ET AL.

Francis A. Cooch
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed May 20, 2008 appealing from the Office action mailed December 21, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

There is a related appeal in U.S. patent application No. 10/257,196 (originally filed October 9, 2002), titled Method and Apparatus for Air Treatment which was filed for appeal on March 13, 2008.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

Under subheading 1 of the Appellants Appeal Brief, claim 5 is cancelled. Therefore, the grounds of rejection to be reviewed on appeal are whether claims 1, 4, 6-9, 12, 16, 18, 19, 23-27 and 29-30 are unpatentable under 35 USC 103(a) over the

combination of Goswani (U.S. Patent No. 5,993,738) in view of Korte (Derwent Pub. No. 4001305) and Reisfeld et al. (U.S. Patent No. 6,884,399).

Under subheading 4 of the Appellants Appeal Brief, Reisfeld et al. (U.S. Patent No. 6,884,399) is included in the rejection. Therefore, the Brief should read, "Whether claims 11, 13 and 14 are unpatentable under 35 USC 103(a) over the combination of Goswani (U.S. Patent No. 5,993,738) in view of Korte (Derwent Pub. No. DE 4001305) and Reisfeld (U.S. Patent No. 6,884,399) as applied to claims 1 and 12 above, and further in view of Kekez (U.S. Patent No. 5,882,591)."

Under subheading B of the Double Patenting Rejection, claim 5 is cancelled. Thus, the Brief should read, "The Examiner has provisionally rejected claims 1, 4, 6-13, 15-17, 22-24, and 27-28 on the ground of nonstatutory obviousness type double patenting..."

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,993,738	**Goswani**	**04-2005**
6,884,399	**Reisfeld et al.**	**04-2005**
5,972,196	**Murphy et al.**	**10-1999**
6,673,137	**Wen**	**01-2004**
5,882,591	**Kekez**	**03-1999**
5,766,455	**Berman et al.**	**06-1998**
5,656,246	**Patapoff et al.**	**08-1997**

Korte, N. "Trace Organics Removal from Flue Gas - by UV Irradiation after Wet Scrubbing" Derwent Publication No. DE 4001305 A (July 25, 1991)

The principle evidence relied upon in which the Appellant's principle arguments are directed include Goswani (U.S. Patent No. 5,993,738), Reisfeld et al. (U.S. Patent No. 6,884,399) and Korte (Derwent Publication No. DE 4001305 A).

Goswani (U.S. Patent No. 5,993,738) discloses a system for neutralizing airborne pathogens comprising a flow through reaction chamber having a chamber inlet and outlet, a supply of aqueous liquid, and an ultraviolet light source that is utilized to neutralize airborne pathogens.

Korte (Derwent Publication No. DE 4001305 A) discloses a system for neutralizing airborne pathogens by utilizing ultraviolet light immediately preceded by hydrogen peroxide to optimize the neutralization process.

Reisfeld et al. (U.S. Patent No. 6,884,399) discloses a system for neutralizing airborne pathogens comprising a chamber inlet and outlet as well as an ultraviolet light

source and a porous matrix that provides additional surface area for which the neutralization of pathogens can occur.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4, 6-9, 12, 16, 18, 19, 23-27 and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goswani (U.S. Patent No. 5,93,738) in view of Korte (Derwent Publication No. DE 4001305) and Reisfeld et al. (U.S. Patent No. 6,884,399).

Goswani discloses a system for neutralizing airborne pathogens, comprising:

A. a flow through reaction chamber having:

1. A chamber air inlet at a first end of the reaction chamber to admit air contaminated with pathogens, and
2. a chamber air outlet at a second end of the reaction chamber to release a decontaminated air, and defining between the air inlet and air outlet a passageway, as shown in Figure 3 and disclosed in column 5, lines 28-68 and column 6, lines 1-36.

B. a supply of an aqueous liquid connected to a conduit (that is a nozzle inside the chamber concerning claim 4) that is capable of introducing aqueous hydrogen peroxide into the reaction chamber as disclosed in column 5 lines 29-45, and

C. an ultraviolet light source (24) for introducing UV light into the reaction chamber as shown in Figure 4; and

More specifically, the water spray or atomizer unit is configured with a nozzle. Goswani does not appear to disclose that the system includes a supply of aqueous hydrogen peroxide or a supply of ozone (concerning claim 12).

Korte discloses a system for neutralizing airborne pathogens in paragraphs 1-13 wherein the system utilizes ultraviolet light immediately preceded by aqueous hydrogen peroxide and ozone in order to further optimize the neutralization process (paragraphs 4, 8, and 9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Goswani to utilize a supply of hydrogen peroxide and ozone in the reaction chamber in order to further optimize the neutralization process as exemplified Korte.

Goswani does not appear to disclose a porous matrix for providing additional surface area on which the neutralization of pathogens can occur. Goswani does however, teach an electrostatic precipitator having photocatalyst-coated plates used to trap microorganisms for destruction. Goswani teaches that the microorganisms are held captive on the plates "for a time greater than the minimum required residence time for photocatalytic destruction" (column 2, lines 52-61).

Reisfeld discloses a system for the neutralization of airborne pathogens comprising a chamber air inlet and a chamber air outlet, and an ultraviolet light source (20) for introducing UV light into the reaction chamber. The reference continues to disclose that the apparatus contains a porous matrix made of aluminum foam (concerning claims 6-8) that is capable of providing additional surface area on which the neutralization of pathogens can occur (column 4, lines 1-25). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Goswani to include a porous matrix made of metal foam in order to trap the contaminants and allow the sterilizing sources more time to decontaminate said contaminates as exemplified by Reisfeld. Goswani teaches that it is desireable to trap microorganisms to allow sufficient time for destruction.

Concerning claim 9, Reisfeld also discloses that the porous matrix is removable in order to provide a matrix that is inflammable and one that can be cleaned and replaced easily (column 4, lines 7-25). As shown in Figures 1 and 2, the matrix is in direct connection with the purifier (10). As shown in Figure 4, the purifier is removable. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Goswani to include the porous matrix made of a metal aluminum foam that is removable in order to provide a matrix that is inflammable and allow the matrix to be removed for maintenance as exemplified by Reisfeld.

Regarding claim 16, the reference discloses that the system includes a solid support (column 3, lines 50-64; column 4, lines 51-57. In regard to claims 18 and 19,

the reference also discloses that the solid support comprises compounds that neutralize pathogens and chemical toxins in column 2, lines 9-30.

Concerning claim 23, the reference discloses that the system is capable of being configured for operation in a continuous mode in column 3, lines 38-52. More specifically, the system is used in conjunction with an HVAC system that is fully capable of running in a continuous mode. With regards to claim 24, the reference discloses that the system is configured to be activated upon demand in column 6, lines 26-59. More specifically the reference discloses "when power is supplied" and "the test unit is started", implying that the unit can be turned off and on, which discloses that it can be activated on demand. Regarding claim 25, Goswani discloses that the system further comprises a fan (65) to move air through the passageway. Concerning claim 26, the system also includes sensors (52) that are capable of controlling an amount of hydrogen peroxide in the reaction chamber. More specifically, the sensor detects the relative humidity in the reaction chamber. If the humidity is too low, then the atomizer unit sprays the liquid into the chamber. The sensor is fully capable of detecting an amount of liquid (hydrogen peroxide) and controlling that amount using the atomizer unit (column 5, lines 29-45). Concerning claim 27, Goswani discloses that the ultraviolet light source emits high intensity UV light as broadly defined (column 3, lines 8-37).

Claims 29 and 30 further requires that the concentration of the aqueous hydrogen peroxide solution to be in the range of 1-25 percent. It would have been well within the purview of one of ordinary skill in the art to optimize the concentration of the

hydrogen peroxide in the solution in order to maximize the sterilization process efficiently and effectively. Only the expected results would be attained.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goswani (U.S. Patent No. 5,993,738) in view of Korte (Derwent Publication No. DE 4001305) and Reisfeld et al. (U.S. Patent No. 6,884,399) as applied to claim 1 above, and further in view of Murphy et al. (U.S. Patent No. 5,972,196).

Goswani in view of Korte and Reisfeld is relied upon as set forth above. Goswani in view of Korte does not appear to specifically disclose the device used for the supply of hydrogen peroxide. Murphy discloses a system for the production of ozone and hydrogen peroxide used for sterilization purposes (column 13, lines 25-36). The system comprises a hydrogen peroxide generator (referenced as an electrochemical cell) connected to a water supply (74) and a source of electricity as disclosed in column 13 lines 15-63. Concerning claim 3, the system also includes a reservoir of aqueous hydrogen peroxide in the generator in column 21, lines 1-28. More specifically, as broadly defined a reservoir is a place where anything is collected or accumulated. The cathode chamber is blocked to entrap the hydrogen peroxide inside the chamber to increase yield. Therefore, it is a reservoir supplying aqueous hydrogen peroxide. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the hydrogen peroxide generator with a reservoir in the system of Goswani in order increase the production yield of hydrogen peroxide and to supply the system with the liquid in an efficient and effective manner as exemplified by Murphy.

Claims 10 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goswani (U.S. Patent No. 5,93,738) in view of Korte (Derwent Publication No. DE 4001305) and Reisfeld et al. (U.S. Patent No. 6,884,399) as applied to claims 1 and 27 above, and further in view of Wen (U.S. Patent No. 6,673,137)

Goswani in view of Korte and Reisfeld is relied upon as set forth above. Goswani in view of Korte and Reisfeld does not appear to disclose the use of a microwave generator. Wen discloses a system for neutralizing airborne pathogens comprising a flow through reaction chamber with a chamber inlet and a chamber outlet, a supply of aqueous disinfectant connected to a conduit for introducing aqueous disinfectants into the reaction chamber (column 3, lines 24-43), and an ultraviolet light source for introducing UV light into the reaction chamber (column 2, lines 10-35). The reference discloses further that a microwave generator is used in conjunction with a UV source to introduce microwaves into the reaction chamber to increase the effectiveness of the antimicrobial ions from the treated air (column 2, lines 10-35). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Goswani to include a microwave generator to introduce microwaves into the reaction chamber in order to further increase the effectiveness of the antimicrobial ions from the treated air as exemplified by Wen.

With regards do claim 28, Goswani does not appear to disclose that the UV light source emits UV light having a wavelength in a range from about 250 to about 300 nanometers. Wen continues to disclose that the ultraviolet light source is a high intensity light source (column 4, lines 10-20) and that the high intensity light source

emits UV light at a wavelength from about 240 to 280 nanometers in column 4, lines 60-65 as such is enough energy to kill pathogens. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the ultraviolet light source of Goswani to include a UV light source that emits UV light at a wavelength of about 240 to 280 nanometers, as such is a commonly known wavelength with enough energy to kill airborne pathogens as exemplified by Wen.

Claims 11, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goswani (U.S. Patent No. 5,93,738) in view of Korte (Derwent Publication No. DE 4001305) and Reisfeld et al. (U.S. Patent No. 6,884,399) as applied to claims 1 and 12 above, and further in view of Kekez (U.S. Patent No. 5,882,591).

Goswani in view of Korte and Reisfeld is relied upon as set forth above. Goswani in view of Korte and Reisfeld does not appear to disclose an ultrasonic wave generator to introduce ultrasonic waves into the reaction chamber. Kekez discloses a system for sterilization of biological fluids using ozone citing that ozone is a common disinfectant used to sterilize various decontaminates in column 1, lines 11-28. The reference continues to disclose that an ultrasonic generator is used to introduce ultrasonic waves into the reaction chamber so that very fine atomization of the liquid spray can be achieved (column 4, lines 29-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Goswani to include an ultrasonic generator to generate waves into the reaction chamber

so that very fine atomization of the liquid spray can be achieved as exemplified by Kekez

Concerning claims 13 and 14, Goswani in view of Korte and Reisfeld is relied upon as set forth above. Goswani in view of Korte and Reisfeld does not appear to specifically disclose the type of ozone supply used in the system. However, it is commonly known in the art to utilize an ozone generator to supply ozone. Kekez also discloses that the ozone of the system includes a supply that is an ozone generator (10) that includes a reservoir (concerning claim 14) that contains ozone (column 4, lines 5-27). More specifically, the ozone generator discloses containing a separation unit to separate the ozone from the oxygen. As broadly defined, a reservoir is a place where anything is collected or accumulated; therefore the separation unit is a reservoir for the ozone. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize an ozone generator with a reservoir in order to introduce the ozone to the reaction chamber in the system of Goswani, as such is a commonly known device that is used for supplying ozone as exemplified by Kekez.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goswani (U.S. Patent No. 5,93,738) in view of Korte (Derwent Publication No. DE 4001305), Reisfeld et al. (U.S. Patent No. 6,884,399) and Kekez (U.S. Patent No. 5,882,591) as applied to claims 1 and 12 above, and further in view of Murphy (U.S. Patent No. 5,972,196).

Goswani in view of Korte, Reisfeld and Kekez is relied upon as set forth above. Goswani in view of Korte, Reisfeld and Kekez does not appear to disclose that the

system further comprises a mixing chamber for mixing ozone and aqueous hydrogen peroxide. Murphy is relied upon as set fort in reference to claims 2 and 3 above. Murphy continues to disclose that the electrochemical cell is an ozone generator as well (column 13, lines 25-68; column 14, lines 1-56). Concerning claim 15, the ozone and hydrogen peroxide generator (referenced as an electrochemical cell) is also a mixing chamber that is capable of mixing ozone and aqueous hydrogen peroxide. As disclosed throughout the entire document but more specifically in columns 13 and 14 lines 25-68 and 1-68 respectively, the generator (72) produces ozone and hydrogen peroxide in the cathodic and anodic chambers. As disclosed in column 16 lines 46-60 with reference to Figure 7, a mixture of ozone and hydrogen peroxide is sent from the generator (72) to a vessel (102) to sterilize a fluid. Since there is no other place for the hydrogen peroxide and ozone to mix, then it is mixed in the generator. Therefore, the generator is a mixing chamber for mixing ozone and hydrogen peroxide. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Goswani to include the generator of Murphy in order to reduce the number of materials needed and ultimately reduce the cost by supplying one generator for the ozone, the hydrogen peroxide, and the mixing chamber as exemplified by Murphy.

Claims 17, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goswani (U.S. Patent No. 5,93,738) in view of Korte (Derwent Publication No. DE 4001305) and Reisfeld et al. (U.S. Patent No. 6,884,399) as applied to claim 16 above, and further in view of Berman (U.S. Patent No. 5,766,455).

Goswani in view of Korte and Reisfeld is relied upon as set forth above. Goswani does not appear to disclose that the solid support comprises ozone removal catalysts or that the catalyst is made from platinum. Berman discloses a system for neutralizing airborne pathogens such as chemical and biological contaminants in column 2, lines 10-35. The reference also discloses a solid support that is an ozone removal catalyst made from platinum to increase the efficiency of the degradation process (column 1 and 2, lines 65-68 and 1-5; column 4, lines 1-15). More specifically, since the catalyst is made from platinum then it is an ozone removal catalyst. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the solid support of Goswani to include making the solid support with an ozone removal catalyst comprised of platinum to increase the efficiency in the degradation of the chemical and biological toxins as exemplified by Berman.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goswani (U.S. Patent No. 5,93,738) in view of Korte (Derwent Publication No. DE 4001305), Reisfeld et al. (U.S. Patent No. 6,884,399) and Kekez (U.S. Patent No. 5,882,591) as applied to claim 13 above, and further in view of Patapoff et al. (U.S. Patent No. 5,656,246).

Goswani in view of Korte, Reisfeld and Kekez are relied upon as set forth above. Goswani in view of Korte, Reisfeld and Kekez does not appear to specifically disclose the type of ozone generator used in the system. However, one of ordinary skill would know that a corona discharge generator may be used in the system, as such is a commonly known ozone generator in the art of sterilization. Patapoff discloses a

system for neutralizing airborne pathogens utilizing enhanced ozonation in column 2, lines 15-41. The reference continues to disclose that the system includes an ozone generator and that a suitable ozone generator is one of corona discharge (column 3, lines 14-22). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the ozone generator in the system of Goswani in view of Korte, Reisfeld and Kekez is a corona discharge generator, as such is a commonly used type of ozone generator in the art of sterilization as exemplified by Patapoff.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 4, 6-13, 15-17, 22-24, and 27-28 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 4, 5, 7-10, 18 and 19 of copending Application No. 10/257196 in view of Korte (Derwent Publication No. DE 4001305).

The claims of the copending application encompass all the limitations from the claims of the instant application except for the introduction of an aqueous hydrogen peroxide. Korte provides this conventional teaching of the neutralization of airborne pathogens utilizing ultraviolet light in combination with hydrogen peroxide in order to increase the effectiveness of the neutralization process.

This is a provisional obviousness-type double patenting rejection.

(10) Response to Argument

Claims 1, 4, 6-9, 12, 16, 18, 19, 23-27 and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goswani (U.S. Patent No. 5,93,738) in view of

Korte (Derwent Publication No. DE 4001305) and Reisfeld et al. (U.S. Patent No. 6,884,399).

Claim 1

(a) The Appellant argues on page 6 that:

Applicants' claim 1 recites a porous matrix as an element of the invention. In the rejection of claim 1, only Reisfeld et al. is cited as disclosing a porous matrix (citing col. 4, lines 1-25). In fact, Reisfeld et al. discloses a photocatalytic air purifier comprising in part, a honeycombed filter 12 having a catalytic coating activated by UV light (see also Fig. 3). Reisfeld et al. further discloses that organic compounds in the air react with the activated catalyst and are converted into water and carbon dioxide (col. 4, lines 26-34). It is clear from Reisfeld et al. that the purpose of the filter is to provide a surface on which to place the catalytic coating.

The porous matrix of Applicants' invention, on the other hand, is not primarily used as a filter having a coating to react with pollutants in the air, but, rather, Applicants' porous matrix has a different primary function and purpose, that is, to provide additional surface area on which free radicals can react with pathogens, as recited in claim 1. See Applicants' specification, paragraph [0045]. Applicants normally neutralize pathogens through means other than the porous matrix and, therefore, Reisfeld et al., which, as noted, only discloses a filter with a catalytic coating for treating air is inapposite.

It is clear that a honeycomb filter is a porous matrix, as a porous matrix is simply an array of elements that allows the tortuous passage of a liquid or gas. It is also clear that a filter is provided in any system to remove impurities from the liquid or gas in that

system. The filters (12, 14 and 16) of Reisfeld trap contaminants from the air flowing through the reaction chamber (as shown in Figure 1), wherein an ultraviolet light activates a photocatalytic coating to neutralize those contaminants (column 2, lines 32-39). The limitations of the Appellant's independent claim with respect to the porous matrix specifically state, "a porous matrix for providing additional surface area on which the neutralization of pathogens can occur." The filter of Reisfeld is a porous matrix. The porous matrix comprises a surface area that traps airborne pathogens. Once the airborne pathogens are trapped on the surface area of the filter, then said pathogens are neutralized by the ultraviolet light activating the catalytic coating on said filter. Therefore, the limitations of the porous matrix providing additional surface area to neutralize pathogens are met with respect to Reisfeld.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Kevin Joyner /Jill Warden/
Supervisory Patent Examiner, Art Unit 1797

Conferees:

/Jill Warden/
Supervisory Patent Examiner, Art Unit 1797

Glenn Caldarola
/Glenn A Caldarola/
Acting SPE of Art Unit 1797